CLAIMS

What is claimed is:

1. A video encoder (200, 300) for encoding video signal data of a current picture in association with at least one reference picture, the encoder comprising:

a reference picture weighting applicator (292, 392); and

a reference picture weighting factor unit (272, 372) responsive to a frame difference and in signal communication with the reference picture weighting applicator for assigning a weighting factor corresponding to the at least one reference picture.

2. A video encoder as defined in Claim 1 wherein the reference picture weighting factor unit is responsive to a motion compensated frame difference.

3. A video encoder as defined in Claim 1 wherein the frame difference is calculated between the current picture and the at least one reference picture

4. A video encoder as defined in Claim 1 wherein the reference picture weighting factor unit is responsive to a plurality of reference pictures corresponding to any sequence.

5. A video encoder as defined in Claim 2 wherein the reference picture weighting factor unit is further responsive to weighting factors iteratively derived from the motion compensated frame difference.

6. A video encoder as defined in Claim 2 wherein the reference picture weighting factor unit is further responsive to weighting factors derived from at least one of statistical methods or curve fitting.

7. A video encoder as defined in Claim 6 wherein the statistical methods comprise linear regression.

8. A video encoder as defined in Claim 1 wherein the reference picture weighting factor unit applies a weighting offset derived as the average difference between the current picture and a weighted motion compensated reference picture.

9. A video encoder as defined in Claim 4, further comprising a motion compensation unit (290, 390) in signal communication with the reference picture weighting applicator for providing at least one of a motion compensated fade-out start picture and a motion compensated fade-in end picture responsive to the reference picture weighting factor unit for coding at least one fading sequence picture.

10. A video encoder as defined in Claim 9, further comprising a reference picture store (270, 370) in signal communication with each of the reference picture weighting factor unit and the motion compensation unit for storing each of the fade-out start picture and the fade-in end picture.

11. A video encoder as defined in Claim 9 wherein the reference picture weighting applicator applies a weighting factor selected by the reference picture weighting factor unit to at least one of the motion compensated fade-out start picture and the motion compensated fade-in end picture.

12. A video encoder as defined in Claim 11 usable with bi-predictive picture predictors, the encoder further comprising prediction means for forming first and second predictors from the weighted and motion compensated fade-out start and fade-in end pictures, respectively.

13. A video encoder as defined in Claim 12 wherein the weighted and motion compensated fade-out start and fade-in end pictures, respectively, are each from opposite directions relative to all of the at least one cross-fade pictures.

14. A video encoder as defined in Claim 1, further comprising a motion estimation unit (380) in signal communication with the reference picture weighting factor unit for providing motion estimation responsive to a weighting factor in an explicit mode of operation.

15. A video encoder as defined in Claim 8, further comprising a summing unit (394) in signal communication with the reference picture weighting factor unit for applying an offset to the weighted motion compensated reference picture in an explicit mode of operation.

16. A method (700) for encoding video signal data for an image block, the method comprising:

receiving (712) a substantially uncompressed image block;

assigning (714) a weighting factor for the image block corresponding to a particular reference picture having a corresponding index, using frame differences to determine the weighting factor;

computing (716) motion vectors corresponding to the difference between the image block and the particular reference picture;

motion compensating (718) the particular reference picture in correspondence with the motion vectors;

adjusting (720) the motion compensated reference picture by the assigned weighting factor to form a weighted motion compensated reference picture;

subtracting (722) the weighted motion compensated reference picture from the substantially uncompressed image block; and

encoding (724) a signal indicative of the difference between the substantially uncompressed image block and the weighted motion compensated reference picture along with the corresponding index of the particular reference picture.

17. A method as defined in Claim 16 wherein determining a weighting factor comprises calculating an expectation of the frame difference of a current picture with a preceding picture and calculating an expectation of frame difference of the current picture with a subsequent picture.

18. A method as defined in Claim 16 wherein determining a weighting factor comprises performing a linear regression on a sequence indicative of the current picture.

19. A method as defined in Claim 16 wherein determining a weighting factor comprises fitting a curve to a sequence indicative of the current picture.

20. A method as defined in Claim 19, further comprising subsampling the image to save computations.

21. A method as defined in Claim 19, further comprising iterating a weighting factor to take the motion into consideration.

22. A method as defined in Claim 21 wherein iterating comprises:

computing a first iteration using at least one of a frame difference and a displaced frame differential;

estimating a motion vector between a current picture and a weighted reference picture using Weighted Prediction; and

computing the weighting factor using at least one of a motion compensated frame difference and a displaced frame differential.

23. A method as defined in Claim 16, further comprising determining a weighting offset.

24. A method as defined in Claim 23 wherein determining the weighting offset comprises:

taking an expectation on both sides; and

deriving the weighting offset as the average difference between the current picture and weighted motion compensated reference picture.

25. A method as defined in Claim 16 wherein computing motion vectors comprises:

testing within a search region for every displacement within a pre-determined range of offsets relative to the image block;

calculating at least one of the sum of the absolute difference and the mean squared error of each pixel in the image block with a motion compensated reference picture; and

selecting the offset with the lowest sum of the absolute difference and mean squared error as the motion vector.

26. A method as defined in Claim 16 wherein bi-predictive picture predictors are used, the method further comprising:

assigning a second weighting factor for the image block corresponding to a second particular reference picture having a second corresponding index;

computing motion vectors corresponding to the difference between the image block and the second particular reference picture;

motion compensating the second particular reference picture in correspondence with the motion vectors;

multiplying the motion compensated second reference picture by the assigned second weighting factor to form a weighted motion compensated second reference picture;

subtracting the weighted motion compensated second reference picture from the substantially uncompressed image block; and

encoding a signal indicative of the difference between the substantially uncompressed image block and the weighted motion compensated second reference picture along with the corresponding index of the second particular reference picture.

27. A method as defined in Claim 26 wherein the two different reference pictures are both from the same direction relative to the image block.

28. A method as defined in Claim 26 wherein computing motion vectors comprises:

testing within a search region for every displacement within a pre-determined range of offsets relative to the image block;

calculating at least one of the sum of the absolute difference or the mean squared error of each pixel in the image block with a first motion compensated reference picture corresponding to the first predictor;

selecting an offset with the lowest sum of the absolute difference or mean squared error as the motion vector for the first predictor;

calculating at least one of the sum of the absolute difference or the mean squared error of each pixel in the image block with a second motion compensated reference picture corresponding to the second predictor; and

selecting an offset with the lowest sum of the absolute difference or mean squared error as the motion vector for the second predictor.